0062759

Waste Site Reclassification Form

Date Submitted: 07/15/04 Originator: R. A. Carlson Phone: 373-9759	Operable Unit(s): 100-KR-2 Waste Site ID: 100-K-32 Type of Reclassification Action: Rejected ☐ Closed Out ☐ Interim Closed Out ☒ No Action ☐	Control Number: 2004-039 Lead Agency: EPA RECEIVED SEP 17 2004 EDMC

This form documents agreement among the parties listed below authorizing classification of the subject unit as rejected, closed out, interim closed out, or no action and authorizing backfill of the site, if appropriate. Final removal from the National Priorities List of no action, interim closed out, or closed-out sites will occur at a future date.

Description of current waste site condition:

Sampling and evaluation of this site have been performed in accordance with remedial action objectives and goals established by the *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington*, U.S. Environmental Protection Agency, Region 10, Seattle, Washington (Remaining Sites ROD). The selected action involved (1) sampling the site, (2) cleaning up the site, (3) demonstrating through a combination of field screening and verification sampling that cleanup goals have been met, and (4) proposal for interim close out.

Basis for reclassification:

The 100-K-32, 183-KW Sulfuric Acid Tank Bases (East Tank) site meets the remedial action objectives (RAOs) specified in the Remaining Sites ROD. The results demonstrated that residual contaminant concentrations support future unrestricted land uses that can be represented (or bounded) by a rural-residential scenario. Also, the results showed that residual contaminant concentrations support unrestricted future use of the shallow zone soil (i.e., surface to 4.6 m [15 ft]) and that contaminant levels remaining in the soil meet the RAOs for direct exposure and are protective of groundwater and the Columbia River. The basis for reclassification is described in detail in the *Remaining Sites Verification Package for the 100-K-32, 183-KW Sulfuric Acid Tank Bases (East Tank)* (attached).

J. Zeisloft DOE-RL Assistant Manager	Signature	Date 7/19/04
NA Ecology Project Manager	Signature	Date
L. E. Gadbois EPA Project Manager	Signature	Date 7-27-2004

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REMAINING SITES VERIFICATION PACKAGE FOR THE 100-K-32, 183-KW SULFURIC ACID TANK BASES (EAST TANK)

Attachment to Waste Site Reclassification Form 2004-039

July 2004

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-K-32, 183-KW SULFURIC ACID TANK BASES (EAST TANK)

EXECUTIVE SUMMARY

The 100-K-32 site is located within the 100-KR-2 Operable Unit in the 100-K Area of the Hanford Site. The site consists of two aboveground, U-shaped concrete bases that historically supported a cylindrical tank and associated aboveground piping. The tank was used to store sulfuric acid and measured 3 m (10 ft) in diameter, 10 m (33 ft) long, and had a 77,140-L (20,380-gal) capacity. The tank was removed but the two concrete bases and some felt padding remained at the site.

Confirmatory sampling was conducted at the 100-K-32 site during April 2003, using a phased sampling approach. Field screening for pH measurements following a systematic grid of the site, plus screening of soil-stained areas, was used to determine the focused/judgmental soil and waste material sample locations for laboratory analysis. The focused/judgmental sample strategy was also based on visual evaluation of the site, photographs, operational history, and suspected waste materials. In addition, biased samples of the remaining felt padding and stained areas on the concrete bases were collected. A total of four soil samples, two concrete samples, a felt sample, and field quality control samples were analyzed for arsenic, asbestos, barium, cadmium, chromium (hexavalent and total), lead, selenium, silver, mercury, sulfate, and pH. In addition, the felt sample was analyzed for polychlorinated biphenyls (aroclor).

The analytical laboratory results for cadmium (concrete), total chromium (concrete), lead (soil), and mercury (soil) exceeded action levels, indicating that site remediation (remove, treat, and dispose) was required. A cleanup action was implemented during December 2003, removing the concrete bases (including the felt) and about 0.61 m (2 ft) of contaminated soil from the 100-K-32 site and disposing of it at the Environmental Remediation Disposal Facility.

Verification sampling was conducted during December 2003 and January 2004. The verification sampling results indicated that the cleanup action had achieved compliance with the remedial action objectives (RAOs) for the 100-K-32 site. A summary of the evaluation of analytical results against the *Model Toxics Control Act -- Cleanup* (*Washington Administrative Code* [WAC] 173-340) criteria is presented in Table ES-1. The results of the verification sampling event are being used to make decisions for reclassifying the 100-K-32 site in accordance with the Waste Site Reclassification Guideline TPA-MP-14 (DOE-RL 1998) process.

In accordance with this evaluation, the verification sampling results support a reclassification of this site to interim closed out. The current site conditions achieve the RAOs and the corresponding remedial action goals (RAGs) established in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (DOE-RL 2004b) and the Interim Action Record of Decision for the 100-BC-1, *100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units* (EPA 1999). These results also show that residual soil concentrations support future land uses that can be represented (or bounded) by a rural-residential scenario, that residual concentration supports unrestricted future use of shallow zone soil (i.e., surface to 4.6 m [15 ft]), and that residual soil contaminant levels are protective of groundwater and the Columbia River.

Table ES-1. Summary of Contaminants of Potential Concern for the 100-K-32 Site.

Regulatory Requirement	Remedial Action Goals	Results	Remedial Action Objectives Attained?
Direct Exposure – Radionuclides	Attain 15-mrem/yr dose rate above background over 1,000 years.	There are no radionuclide COPCs for this site.	Not Applicable
Direct Exposure – Nonradionuclides	Attain individual COPC RAGs.	All individual COPC concentrations are below the direct exposure criteria.	Yes
Risk Requirements – Nonradionuclides	Attain a hazard quotient of <1 for all individual noncarcinogens.	All hazard quotients are less than 1.	Yes
	Attain a cumulative hazard quotient of <1 for noncarcinogens.	The cumulative hazard quotient (0.101) is less than 1.	
	Attain an excess cancer risk of $<1 \times 10^{-6}$ for individual carcinogens.	Excess cancer risk for individual carcinogens are all less than 1×10^{-6}.	
	Attain a total excess cancer risk of $<1 \times 10^{-5}$ for carcinogens.	Total excess cancer risk (1.10×10^{-7}) is less than 1×10^{-5}.	
Groundwater/River Protection – Radionuclides	Attain single-COPC groundwater and river protection RAGs.	There are no radionuclide COPCs for this site.	Not Applicable
	Attain national primary drinking water standards:[a] 4 mrem/yr (beta/gamma) dose rate to target receptor/organs.		
	Meet drinking water standards for alpha emitters: the most stringent of 15 pCi/L MCL or 1/25th of the derived concentration guides from DOE Order 5400.5.[b]		
	Meet total uranium standard of 21.2 pCi/L.[c]		
Groundwater/River Protection – Nonradionuclides	Attain individual nonradionuclide groundwater and river cleanup requirements.	Maximum detected results for lead and mercury are above groundwater and river RAGs. However, RESRAD modeling results indicate that they will not reach groundwater (and, therefore, the Columbia River) within 1,000 years. Therefore, their residual concentrations achieve the RAOs for groundwater and river protection.	Yes

[a] "National Primary Drinking Water Regulations" (40 *Code of Federal Regulations* 141).
[b] *Radiation Protection of the Public and the Environment* (DOE Order 5400.5).
[c] Based on the isotopic distribution of uranium in the 100 Areas, the 30 µg/L MCL corresponds to 21.2 pCi/L. Concentration-to-activity calculations are documented in *Calculation of Total Uranium Activity Corresponding to a Maximum Contaminant Level for Total Uranium of 30 Micrograms per Liter in Groundwater* (BHI 2001).

COPC = contaminant of potential concern
DOE = U.S. Department of Energy
MCL = maximum contaminant level
RESRAD = RESidual RADioactivity (dose model)

REMAINING SITES VERIFICATION PACKAGE FOR THE 100-K-32, 183-KW SULFURIC ACID TANK BASES (EAST TANK)

STATEMENT OF PROTECTIVENESS

This report demonstrates that the site meets the objectives for interim closure as established in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (DOE-RL 2004b) and the *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units* (commonly called the Remaining Sites ROD) (EPA 1999). Evaluation of sampling results from the 100-K-32 site demonstrate that residual soil contaminant concentrations support future land uses that can be represented (or bounded) by a rural-residential scenario, that residual concentration supports unrestricted future use of shallow zone soil (i.e., surface to 4.6 m [15 ft]), and that contaminant levels remaining in the soil are protective of groundwater and the Columbia River.

GENERAL SITE INFORMATION AND BACKGROUND

The 100-K-32 site is located within the 100-KR-2 Operable Unit in the 100-K Area of the Hanford Site. The site consists of two aboveground, U-shaped concrete bases that historically supported a cylindrical tank and associated aboveground piping. The tank was used to store sulfuric acid and measured 3 m (10 ft) in diameter, 10 m (33 ft) long, and had a 77,140-L (20,380-gal) capacity. The sulfuric acid storage tank was associated with the 183-KW Water Treatment Plant. The period during which the storage tank was active is not known. The 100-K-32 Waste Information Data System (WIDS) summary report is presented in Appendix A.

CONFIRMATORY SAMPLING ACTIVITIES

Site Walkdown

A site walkdown was performed during March 2003, with the U.S. Department of Energy, Richland Operations Office, the lead regulatory agency (U.S. Environmental Protection Agency [EPA]), and the project team. The objective of the walkdown was to gather the necessary information to finalize the sampling requirements specified in the 100-K-32 waste site evaluation (BHI 2003f). The walkdown verified that the site had not changed from the description and photographs in WIDS. The concrete tank support bases remained, with some of the felt pad material remaining in the U-shaped saddles. The ground surface was composed of about 2.5 to 15 cm (1 to 6 in.) of crushed gravel. There were visible yellow stains on the gravel in several locations as well as some smaller areas of disturbed gravel with finer particle sizes, indicating possible corrosion by sulfuric acid.

Contaminants of Potential Concern

The contaminants of potential concern (COPCs) for the 100-K-32 waste site were identified based on process knowledge pertaining to the characteristics of the sulfuric acid used in historical water treatment processes on the Hanford Site. The COPCs include asbestos, chromium (hexavalent and total), arsenic, barium, cadmium, lead, selenium, silver, mercury, polychlorinated biphenyls (PCBs) (aroclor), sulfate, and pH. The sulfuric acid tanks were part of the water treatment plant facilities, and were located far from any radiological operations; therefore, there are no radiological COPCs for this site.

Confirmatory Sample Design

Confirmatory sampling was conducted at the 100-K-32 site during April 2003. Sampling followed a phased approach using field pH measurements on a systematic grid to evaluate surface soils for acid spill contamination (Phase 1). The results of the field pH measurements were used to identify biased soil sample locations for laboratory analyses (Phase 2). In addition, biased samples of the concrete bases and felt were collected to evaluate possible contamination.

For Phase 1, the site was stratified into four areas based on tank use information and on tank construction drawings (GE 1956a, 1956b), which indicated where acid leaks/spills may have occurred. The *Visual Sample Plan* (PNNL 2002) software tool was then used to establish a systematic triangular grid, with a random start, within three of the four areas to identify field pH measurement locations. Biased sampling areas were identified based on the pH results.

In Phase 2, soil samples from four areas and one duplicate soil sample were submitted to the laboratory for analyses. Field observations of stained gravel and the field pH measurement results were used to determine the focused soil sample locations presented in Figure 1. These samples consisted of the native material from the soil horizon approximately 7.6 cm (3 in.) below the surface gravel layer. The overlying gravel was not included in the soil samples. Phase 2 also included surface samples from stained concrete base areas and the felt padding attached to the concrete bases. The stained concrete samples were collected using a chisel to obtain enough material for the required analyses. Phase 2 field quality control (QC) samples included a duplicate soil sample and an equipment blank (using clean silica sand). Table 1 provides the confirmatory sample summary.

Figure 1. Confirmatory Sample Locations at the 100-K-32 Site.

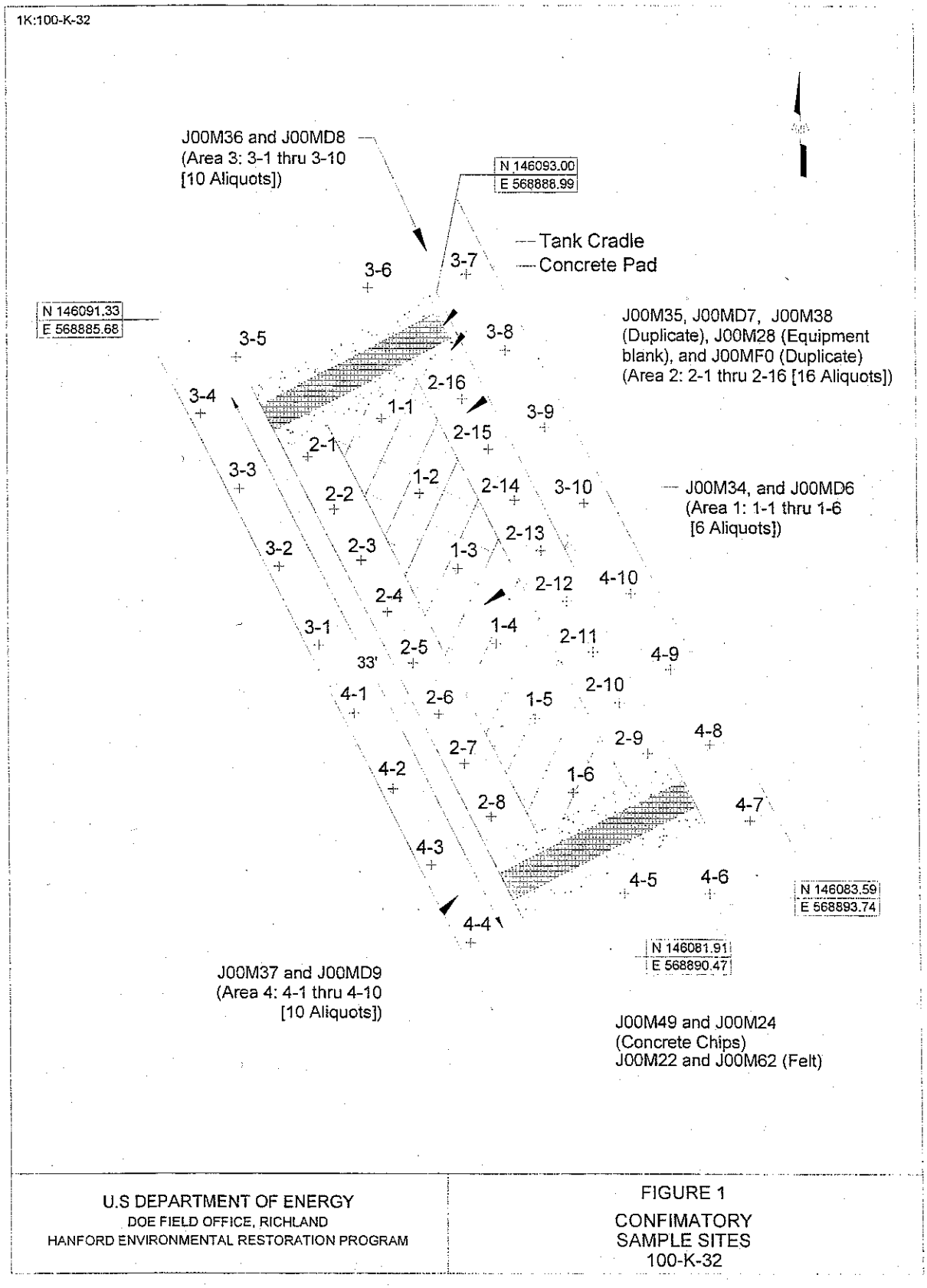

Table 1. Confirmatory Sample Summary Table.[a]

Sample Location	Sample Media	HEIS Sample Number	Sample Analyses
Area 1	Soil	J00M34 J00MD6	J00M34 to J00M37: As, Ba, Cd, Cr (hexavalent and total), Pb, Se, Ag, Hg, PCBs (aroclor), sulfate, and pH. J00MD6 to J00MD9: Asbestos.
Area 2	Soil	J00M35 J00MD7	
Area 3	Soil	J00M36 J00MD8	
Area 4	Soil	J00M37 J00MD9	
Stained concrete surfaces	Concrete	J00M49 J00M24	J00M49: As, Ba, Cd, Cr (total), Pb, Se, Ag, Hg, sulfate, and pH. J00M24: Cr (hexavalent).
Felt (on concrete base)	Felt	J00M22 J00M62[b]	J00M22: PCBs (aroclor), As, Ba, Cd, Cr (total), Pb, Se, Ag, Hg, sulfate, and pH. J00M62: Asbestos.
Quality Control Samples			
Duplicate (of J00M35)	Soil	J00M38	As, Ba, Cd, Cr (hexavalent and total), Pb, Se, Ag, Hg, sulfate, and pH.
Duplicate (of J00MD7)	Soil	J00MF0	Asbestos.
Equipment blank (of J00M35)	Silica sand	J00M28	As, Ba, Cd, Cr (total), Pb, Se, Ag, Hg, and sulfate.

[a] Logbook EL-1578 (Bowers 2003).
[b] Logbook EL-1577 (Nielson 2003).
HEIS = Hanford Environmental Information System

Confirmatory Sample Results

Confirmatory soil and concrete samples were analyzed using EPA-approved analytical methods. The results are stored in the Hanford Environmental Information System (HEIS) and are included in Appendix B (Table B-1).

Surface soil samples were taken from under and around the former tank locations. Samples were also taken from stained surfaces of the concrete bases and the felt remaining on the concrete bases. For the stained concrete samples, barium, cadmium, and total chromium maximum detected values exceeded the applicable remedial action goals (RAGs). For the felt samples, the maximum detected values did not exceed the applicable RAGs. For the soil data evaluation, lead and mercury maximum detected values exceeded the applicable RAGS; therefore, the site was recommended for remedial action. A comparison of the maximum soil and concrete confirmatory sampling results (Sample Event #1) and the RAGs is presented in Table 3.

REMEDIAL ACTION SUMMARY

The remove, treat, and dispose decision for the 100-K-32 site was supported by the site confirmatory sample results. The analytical laboratory results for cadmium (concrete), total chromium (concrete), lead (soil), and mercury (soil) exceeded action levels, indicating that remediation (remove, treat, and dispose) of the site was required. A cleanup action was implemented during December 2003, removing the concrete bases and about 0.61 m (2 ft) of contaminated soil from the 100-K-32 site and disposing of it at the Environmental Remediation Disposal Facility.

VERIFICATION SAMPLING ACTIVITIES

Contaminants of Concern

The post-remediation verification sampling contaminants of concern (COCs) for the 100-K-32 waste site (arsenic, barium, cadmium, total and hexavalent chromium, lead, and mercury) were identified based on the results of the confirmatory sampling effort, and to ensure that they were not present above cleanup levels below the site surface. Selenium, silver, and sulfate were excluded from verification sample analysis based on their low confirmatory sample concentrations. Because pH was included as a COPC, only for the purposes of indicating the possible location of contamination during confirmatory sampling, it was also excluded from the final verification sampling COC list. Asbestos and PCBs (aroclor) were not included as verification sample COCs because removal of the felt padding and surface soils addressed the potential risk to human health or the environment at the 100-K-32 site. Also, asbestos and PCBs are not mobile in the environment, thus, they would not be expected to be present in subsurface soils.

Verification Sample Design

Following remediation, verification sampling was conducted at the 100-K-32 site during December 2003 and January 2004. The verification sample locations are presented in Figure 2. Four aliquots were collected in the same locations as the confirmatory samples for Areas 1 and 2 (samples J01761 and J01762). A verification sample was also collected from some stained soil along the western edge of the excavated area (sample J015W0). The soil samples consisted of the native soil at the bottom of the excavated area, which represented a soil horizon about 0.61 m (2 ft) below the ground surface. Field QC samples included a duplicate sample (J01763) and a clean silica-sand equipment blank (sample J01760). Area 3 was not sampled again during the verification effort because the COC results during confirmation sampling did not exceed action levels. Although barium and lead exceeded the groundwater protection levels in Area 4, these COCs did not exceed direct exposure action levels, and RESidual RADioactivity (RESRAD) modeling showed that the levels present would not affect groundwater within 1,000 years. Therefore, Area 4 was not sampled again during verification sampling. Table 2 provides the verification sample summary.

Figure 2. Verification Sample Locations at the 100-K-32 Site.

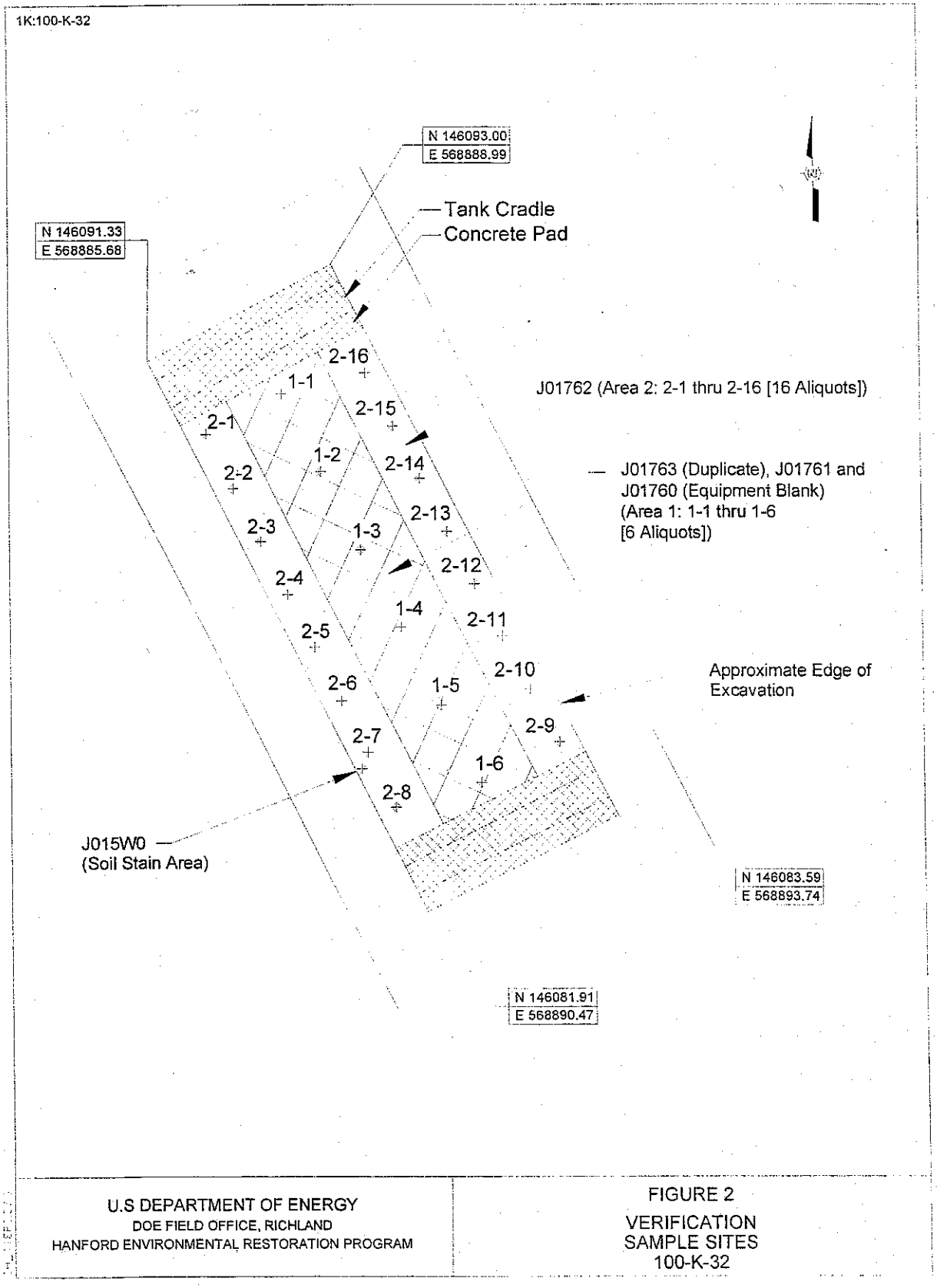

Table 2. Verification Sample Summary Table.[a]

Sample Location	Sample Media	HEIS Sample Number	Sample Analyses
Area 1	Soil	J01761	As, Ba, Cd, Cr (hexavalent and total), Pb, and Hg.
Area 2	Soil	J01762	
Stained soil	Soil	J015W0	As, Ba, Cd, Cr (hexavalent and total), Pb, and Hg.
Quality Control Samples			
Duplicate (of J01761)	Soil	J01763	As, Ba, Cd, Cr (hexavalent and total), Pb, and Hg.
Equipment blank (of J01761)	Silica sand	J01760	As, Ba, Cd, Cr (hexavalent and total), Pb, and Hg.

[a] Logbook EL-1572-1 (Fahlberg 2003).

Verification Sampling Results

The samples were analyzed using EPA-approved analytical methods. The verification sample results are stored in HEIS and are included in Appendix B (Table B-2). Except for mercury, all verification sample COCs are less than background or applicable RAGs. A comparison of the site RAGs and the maximum contaminant results is presented in Table 3.

Table 3. Comparison of 100-K-32 Maximum Sample Values to Action Levels.

COPC/COC	Maximum Result (mg/kg)			RAGs (mg/kg)			Does the Maximum Result Meet RAGs?	
	Sample Event #1		Sample Event #2	Direct Exposure	Soil Standard for Groundwater Protection	Soil Standard for River Protection	Sample Event #1	Sample Event #2
	Soil	Concrete						
Nonradionuclides								
Arsenic	2.2 (<BG)	2.7 (<BG)	3 (<BG)	20[a]	20[a]	20[a]	Yes	Yes
Barium	71.4 (<BG)	305	97.4 (<BG)	5,600	132[b]	--[c]	Yes[d]	Yes
Cadmium[e]	0.38	9	0.2 (<BG)	13.9	0.81[b]	0.81[b]	No	Yes
Chromium (total)	16.5 (<BG)	32.7	16.9 (<BG)	80,000	18.5[b]	18.5[b]	No	Yes
Chromium (hexavalent)[f]	2	1.78	0.23	400[g], 2.1[h]	8	2	Yes	Yes
Lead	42.8	7.2 (<BG)	7.1 (<BG)	353[i]	10.2[b]	10.2[b]	Yes[d]	Yes
Mercury	39.7	0.05 (<BG)	2.4	24	0.33[b]	0.33[b]	No	Yes[d]
Selenium	0.38 (<BG)	0.33 (<BG)	NA	400	5	1	Yes	NA
Sulfate	8,290	484	NA	NA	25,000	--[c]	Yes	NA

[a] The cleanup value of 20 mg/kg has been agreed to by Tri-Party project managers.
[b] Where cleanup levels are less than background, cleanup levels default to background (WAC 173-340-700[4][d]).
[c] A river protection value cannot be calculated because there are no published surface water maximum contaminant level standards.
[d] The RESRAD model results (BHI 2004a) indicate that the COC does not reach groundwater or the river within 1,000 years.
[e] Hanford Site-specific background for cadmium is not available; background value is from Ecology (1994).
[f] There is no Washington State or Hanford Site background value for hexavalent chromium.
[g] WAC 173-340-740(3) noncarcinogenic cleanup limit.
[h] WAC 173-340-750(3) carcinogenic cleanup limit based on the inhalation exposure pathway. See *Calculation of Hexavalent Chromium Carcinogenic Risk* (BHI 2000).
[i] WAC 173-340-740(3) value for lead is not available. Calculated cleanup value using the *Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children* (EPA 1994).
BG = background
NA = not applicable

DATA EVALUATION

All verification sample COCs are less than direct exposure RAGs; however, post-remediation residual levels of mercury exceeded groundwater and river protection RAGs. Where COC concentrations exceed soil RAGs, RESRAD modeling was performed to provide an assessment of the potential impacts that this COC poses to groundwater and the river. Based on the conservative assumption (outlined in DOE-RL [2004b]) that the upper vadose zone concentrations of this COC extends uniformly to groundwater, RESRAD predicts that mercury will exceed the drinking water standard. Because this approach is overly conservative, the mercury contaminant-depth distribution from the 100-K-33 test pit (BHI 2004d) was used in a RESRAD modeling effort (BHI 2004b) to establish the lower vadose zone concentration of mercury at the 100-K-32 site. The RESRAD modeling results indicate that the residual concentrations of this COC will not impact groundwater or the river within 1,000 years and is, therefore, protective.

Nonradionuclide risk requirements include an individual contaminant hazard quotient of less than 1.0, a cumulative hazard quotient of less than 1.0, an individual contaminant carcinogenic risk of less than 1×10^{-6}, and a cumulative carcinogenic risk of less than 1×10^{-5}. For the 100-K-32 site, these risk values were not calculated for constituents that were either not detected, or were detected at concentrations below Hanford Site or Washington State background. All individual hazard quotients for noncarcinogen constituents (hexavalent chromium and mercury) were less than 1.0 (0.001 and 0.100, respectively). The cumulative hazard quotient for these noncarcinogen constituents is 0.101. The carcinogenic risk values for hexavalent chromium, the only carcinogenic constituent above background, or above detection levels, is 1.10×10^{-7}, which is below 1×10^{-6}. The cumulative carcinogenic risk value for the 100-K-32 site is also 1.10×10^{-7}, which is below 1×10^{-5}. Based on the conservative nonradionuclide groundwater and river protection RAGs shown in Table 3, the residual concentrations of nonradionuclide contaminants are protective of groundwater and the Columbia River.

A focused sampling approach was selected for this site; therefore, the WAC 173-340-740(7)(e) three-part test, which is a requirement for statistically-based soil cleanup assessments, is not applicable. The focused sampling approach is considered conservative as it is based on the comparison of maximum contaminant concentrations with their respective RAGs, which shows that the cleanup standards have been met.

DATA QUALITY ASSESSMENT

A data quality assessment (DQA) was performed to compare the confirmatory sampling approach and the resulting analytical data with the sampling and data requirements specified by the project objectives and performance specifications. The review determines if the data are of the right type, quality, and quantity to support their intended use (i.e., closeout decisions [EPA 2000]). The assessment review completes the data life cycle (i.e., planning, implementation, and assessment) that was initiated by the data quality objectives process. A review of the field logbooks and the sample design (verification and validation) showed that the number of samples collected were in accordance with the sample design.

This DQA review was performed in accordance with BHI-EE-01, *Environmental Investigation Procedures.* Specific data quality objectives for the site are found in the *100 Area Remedial Action Sampling and Analysis Plan* (DOE-RL 2001a). The test method selected was a comparison of the maximum values with the RAGs. The results of the application of the test method are included in the data evaluation (above). The DQA was applied to the cleanup verification data based on the selected data test method, and the data evaluation for this site was based on the use of the test method selected (i.e., the comparison to the maximum values of the RAGs). The data review for waste site 100-K-32 determined that the analytical data are the right type, quality, and quantity to support site remediation decisions within specified error tolerances. All analytical data were found acceptable for decision-making purposes (BHI 2003a, 2003b, 2003c, 2003d, 2003e, 2004c).

Quality assurance (QA) results requiring explanation include the following:

- The matrix spike recovery for hexavalent chromium in sample J00M24 (67.75%) did not achieve the minimum recovery limit (75%)

- The ending continuing calibration verification result for sample J015W0 (111.2%) was outside the accepted range (90% to110%)

- The method blank for total chromium exceeded the practical quantitation limit in samples J00M22 and J00M49 (felt padding).

These QA results do not compromise the use of the confirmatory COPC concentrations in remedial action decisions. Limited, random, or sample matrix-specific-influenced batch QC issues are a potential for any analysis. The number and types identified in this analysis were within expectations for the matrix types and analyses performed. Additionally, Hanford soil typically yields low matrix spike recoveries due to the reducing nature of the matrix. Therefore, the confirmatory sample result DQA confirmed that the sample design and analytical data were sufficient to support the decision to implement a removal action at the 100-K-32 site.

All the QA results for the 100-K-32 verification samples achieved EPA contract laboratory QA requirements for holding times, continuing calibration verification, preparation/method blanks, interference check standards, control samples, matrix spike recovery, and duplicate analysis. Therefore, the verification sample result DQA verifies that the sample design and the resulting analytical data are sufficient to support an interim site closure decision for the 100-K-32 site.

SUMMARY FOR INTERIM CLOSURE

A phased sampling approach was implemented at the 100-K-32 site based on site photographs, operational history, suspected waste materials, and statistical information. Confirmatory sampling was conducted during April 2003. The analytical laboratory results for cadmium (concrete), total chromium (concrete), lead (soil), and mercury (soil) exceeded action levels, indicating that remediation (remove, treat, and dispose) was required. A cleanup action was implemented during December 2003, removing the concrete bases (including the felt) and about

0.61 m (2 ft) of contaminated soil from the 100-K-32 site. Verification sampling was conducted during December 2003 and January 2004. The results indicated that the cleanup action achieved compliance with the remedial action objectives for the 100-K-32 site. In addition, RESRAD modeling using test pit data (BHI 2004b) predicted that the deep vadose zone (below 4.6 m [15 ft]) contaminant levels would be below the RAGs.

Evaluation of verification sampling results support reclassification of the 100-K-32 site as interim closed out. The maximum detected results from underlying soil samples collected at locations suspected of having the greatest potential for contamination were shown to meet the cleanup objectives for direct exposure, groundwater protection, and river protection.

REFERENCES

40 CFR 141, "National Primary Drinking Water Regulations," *Code of Federal Regulations,* as amended.

BHI-EE-01, *Environmental Investigations Procedures*, Bechtel Hanford, Inc., Richland, Washington.

BHI, 2000, *Calculation of Hexavalent Chromium Carcinogenic Risk*, Calculation No. 0100X-CA-V0031, Bechtel Hanford, Inc., Richland, Washington.

BHI, 2001, *Calculation of Total Uranium Activity Corresponding to a Maximum Contaminant Level for Total Uranium of 30 Micrograms per Liter in Groundwater*, 0100X-CA-V0038, Bechtel Hanford, Inc., Richland, Washington.

BHI, 2003a, *Data Package Summary Analytical Report (SDG No. 20030551)*, Bechtel Hanford, Inc., Richland, Washington.

BHI, 2003b, *Data Package Summary Analytical Report (SDG No. H2181)*, Bechtel Hanford, Inc., Richland, Washington.

BHI, 2003c, *Data Package Summary Analytical Report (SDG No. H2182)*, Bechtel Hanford, Inc., Richland, Washington.

BHI, 2003d, *Data Package Summary Analytical Report (SDG No. H2484)*, Bechtel Hanford, Inc., Richland, Washington.

BHI, 2003e, *Data Package Summary Analytical Report (SDG No. W04031)*, Bechtel Hanford, Inc., Richland, Washington.

BHI, 2003f, *Waste Site Evaluation for 100-K-32, 183-KW Sulfuric Acid Tank (East Tank)*, 0100K-CA-V0013, Rev. 1, Bechtel Hanford, Inc., Richland, Washington.

BHI, 2004a, *100-K-32 Sulfuric Acid Tank Site RESRAD Calculation Brief*, Calc. No. 0100K-CA-V0032, Bechtel Hanford, Inc., Richland, Washington.

BHI, 2004b, *100-K-33 Sulfuric Acid Tank Site RESRAD Calculation Brief*, 0100K-CA-V0033, Rev. 0, Bechtel Hanford, Inc., Richland, Washington.

BHI, 2004c, *Data Package Summary Analytical Report (SDG No. H2503)*, Bechtel Hanford, Inc., Richland, Washington.

BHI, 2004d, Letter, R. L. Donahoe, Bechtel Hanford, Inc., to J. Zeisloft, U.S. Department of Energy, Richland Operations Office, "Transmittal of Review Copy of Waste Site Reclassification Form and Associated Remaining Sites Verification Package for the 100-K-33 Site," CCN 114339, dated June 10, 2004.

Bowers, D. L., 2003, "Remaining Sites Field Sampling," Logbook EL-1578, pp. 47 to 50, Bechtel Hanford, Inc., Richland, Washington.

DOE Order 5400.5, *Radiation Protection of the Public and the Environment*, as amended, U.S. Department of Energy, Washington, D.C.

DOE-RL, 1998, *Tri-Party Agreement Handbook Management Procedures*, RL-TPA-90-0001, Guideline Number TPA-MP-14, "Maintenance of the Waste Information Data System (WIDS)," U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 2004a, *100 Area Remedial Action Sampling and Analysis Plan*, DOE/RL-96-22, Rev. 4, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 2004b, *Remedial Design Report/Remedial Action Work Plan for the 100 Area*, DOE/RL-96-17, Rev. 5, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Ecology, 1994, *National Background Soil Metals Concentrations in Washington State*, Publication No. 94-115, Washington State Department of Ecology, Olympia, Washington.

EPA, 1994, *Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children*, EPA/540/R-93/081, Publication No. 9285.7-15-1, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1999, *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington*, U.S. Environmental Protection Agency, Region 10, Seattle, Washington.

EPA, 2000, *Guidance for Data Quality Assessment*, EPA QA/G-9, QA00 Update, U.S. Environmental Protection Agency, Office of Environmental Information, Washington, D.C.

Fahlberg, R. T., 2003, "100-K Remedial Sampling," Logbook EL-1572-1, pp. 27 and 38, Bechtel Hanford, Inc., Richland, Washington.

GE, 1956a, *Gravity Acid Feed System 100-K Isometric Piping*, June 4, 1956, Drawing H-1-20572, General Electric Company, Richland, Washington.

GE, 1956b, *Gravity Acid Feed System, Acid Storage Tank Details,* June 4, 1956, Drawing H-1-20569, Sheet 1, General Electric Company, Richland, Washington.

Nielson, R. J., 2003, "Remaining Sites Field Sampling," Logbook EL-1577, p. 49, Bechtel Hanford, Inc., Richland, Washington.

PNNL, 2002, *Visual Sample Plan*, Version 2.0, available at http://dqo.pnl.gov/VSP, Pacific Northwest National Laboratory, Richland, Washington.

WAC 173-340, "Model Toxics Control Act -- Cleanup," *Washington Administrative Code*, 1996.

APPENDIX A

WASTE INFORMATION DATA SYSTEM GENERAL SUMMARY REPORT (3 Pages)

Waste Information Data System
General Summary Report

04/20/2004

Site Code: 100-K-32 **Site Classification: Accepted** **Page 1**

Site Names: 100-K-32, 183-KW Sulfuric Acid Tank Bases (East tank)
Site Type: Storage Tank
Status: Inactive
Operable Unit: 100-KR-2
Hanford Area: 100K

Start Date:
End Date:
Coordinates:
(E) 568889.688
(N) 146087.469
Washington State Plane

Site Description: The unit consists of two above-ground U-shaped concrete bases and aboveground piping. The U-shaped bases are 3.7 meters (12 feet) wide, 1.2 meters (4 feet) long, 1.8 meters (6 feet) high, and 10 meters (33 feet) apart. A cylindrical tank (which appeared at the site in a March 1962 photograph) laid horizontally on two concrete U-shaped bases. The tank was 3 meters (10 feet) in diameter, 10 meters (33 feet) long and had a 77,140-liter (20,380-gallon) capacity. It is unknown when the tank was removed. Tank bases and piping remain. The surface soils are stained with what appears to be acid residue.

Location Description: The site is located east of the 183-KW Head House, south of the end of the railroad tracks and 14.3 meters (47 feet) northeast (60 degrees) of 120-KW-4.

Associated Structures: The Sulfuric Acid Storage Tank was associated with 183-KW Water Treatment Plant. West of this tank are two smaller sulfuric acid tanks (120-KW-3 and 120-KW-4) and another tank the same size as the one described here, all of which were used for the same purpose.

Site Comment: It is unknown when the tank was removed or what was done with it. The tank bases and piping were not removed and are still located at the site.

References:
1. Carpenter, RW and SL Cote, 1994 100-K Area Technical Baseline Report, WHC-SD-EN-TI-239, Rev 0.
2. Kathryn Moss, 9/14/94 WIDS Site Addition: 100-K-32 (#94-304).
3. T. F. Johnson, 4/28/95 Suspect Waste Site Investigation Logbook, EL-1238.
4. 6/4/03 Waste Site Evaluation for 100-K-32 Sulfuric Acid Tank, 0100K-CA-V0013, Rev 1.

Waste Information:

Type: Equipment
Category: Unknown
Physical State: Solid
Description: Two concrete tank pedestals and associated sulfuric acid piping remain at the site.

Type: Soil
Category: Hazardous/Dangerous
Physical State: Solid
Description: The soil is contaminated from sulfuric acid leaks or spills.

Dimensions:

Length:	1.22	Meters	4.00	Feet
Width:	3.66	Meters	12.00	Feet
Depth/Height:	1.83	Meters	6.00	Feet

Site Shape: Rectangle
Comments: The two tank bases are 10 meters (33 feet) apart.
References: 1. Carpenter, RW and SL Cote, 1994 100-K Area Technical Baseline Report, WHC-SD-EN-TI-239, Rev 0.

Site Code: 100-K-32 Site Classification: Accepted

Field Work:

Type: Site Walkdown
BeginDate: 08/21/1996 **FieldCrew:** T. F. Johnson
End Date: 08/21/1996
Purpose: Initial Review
Site Accessible: Yes **Site Found:** Yes
Soil Discoloration: Yes **Debris Visible:** No
References: 1. T. F. Johnson, 4/28/95 Suspect Waste Site Investigation Logbook, EL-1238.

Type: GPS Surveys
BeginDate: 04/01/1998 **FieldCrew:** K.A. Prosser, C. Webb, W. Hayward
End Date: 04/01/1998 **Data Repository:** HGIS
Purpose: Mapping
Comment: The edge of the concrete cradle was located using a Global Positioning System (GPS).
Job Number: 151
Type: Real-Time Kinematic

Type: Surveillance Walkdowns
BeginDate: 04/01/1998
End Date: 04/01/1998
Purpose: Surveillance

Type: Analytical Sampling
BeginDate: 04/18/2003
End Date: 04/18/2003 **Data Repository:** HEIS
Purpose: Evaluation
Comment: Surface soil samples were taken from four areas below and around the former tank locations. HEIS sample numbers include: J00MD6 through J00MD9, J00M22, J00M24, J00M28, J00M34, J00M35, J00M36 through J00M38 and J00M49. The site was recommended for remedial action based on elevated metal levels.
References: 1. 6/4/03 Waste Site Evaluation for 100-K-32 Sulfuric Acid Tank, 0100K-CA-V0013, Rev 1.

Regulatory Information:

Programmatic Responsibility

DOE Program: EM-40 **Confirmed By Program:** Yes
DOE Division: ERD - Environmental Restoration Division
Responsible Contractor/Subcontractor: BHI. Bechtel Hanford, Inc.

Site Evaluation

Solid Waste Management Unit: No
TPA Waste Management Unit Type: Other Storage Area
This site was consolidated with:

Reason:

Permitting

RCRA Part B Permit: No **TSD Number:**
RCRA Part A Permit: No **Closure Plan:** No
RCRA PermitStatus:
Septic Permit: No **216/218 Permit:** No
Inert LandFill: No **NPDES:** No
State Waste Discharge Permit: No
Air Operating Permit: No

Site Code: 100-K-32 **Site Classification: Accepted**

Tri-Party Agreement

Lead Regulatory Agency: EPA
Unit Category: CERCLA Past Practice (CPP)
TPA Appendix: C

Remediation and Closure

Decision Document: Interim Action Record of Decision, 100 Area Remaining Sites (1999)
Decision Document Status: Final
Remediation Design Group: Group 5
Closure Document:
Closure Type:
Post Closure Requirements: **Residual Waste:**

Images:

Pathname: \\apwids01\widsimg\100K\1708\1708_01.JPG DateTaken:
Description: Tank pedestals and piping remain at the site.

Pathname: \\apwids01\widsimg\100K\1708\1708_02.JPG DateTaken:
Description: Stained soil indicate releases from the tank.

Pathname: \\apwids01\widsimg\100K\1708\1708_03.JPG DateTaken: 04/01/1998
Description: Photo shows the 100-K-32 and 100-K-33 tank saddles.

APPENDIX B

100-K-32 SAMPLE RESULTS
(3 Pages)

Table B-1. 100-K-32 Confirmatory Sampling Data Summary.

Sample Area and Depth BGS	HEIS Number	Sample Date	Arsenic			Barium			Cadmium			Chromium			Hexavalent Chromium			Lead Value		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Felt Sample	J00M22	04/18/03	0.5		0.33	39.1		0.01	0.11		0.04	1.5		0.06				3.6		324
Stained Concrete	J00M24*	04/21/03													1.78		0.35			
Equipment Blank of J00M35	J00M28	04/18/03	0.32	U	0.32	1.1		0.01	0.04	U	0.04	0.12		0.06				0.29		0.24
Area 1 2 to 3" bgs	J00M34	04/18/03	2		0.33	63.6		0.01	0.22		0.04	21		0.06	2		0.43	25.7		0.25
Area 2 2 to 3" bgs	J00M35	04/18/03	2.2		0.36	69.2		0.01	0.29		0.04	13.2		0.06	0.43	U	0.43	35.5		0.27
Area 3	J00M36	04/18/03	1.9		0.37	66.6		0.01	0.36		0.04	10		0.06	0.43	U	0.43	42.8		0.27
Area 4	J00M37	04/18/03	1.8		0.4	71.4		0.01	0.38		0.04	7.5		0.07	0.46	U	0.46	14.8		0.3
Duplicate of J00M35	J00M38	04/18/03	2.2		0.35	70.6		0.01	0.32		0.04	16.5		0.06	2		0.43	41.9		0.26
Concrete	J00M49	04/21/03	2.7		0.32	305		0.01	9		0.04	32.7		0.05				7.2		0.24

Sample Area and Depth BGS	HEIS Number	Sample Date	Mercury			Selenium			Silver			Sulfate			pH
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	
Felt Sample	J00M22	04/18/03	0.14		0.02	0.79		0.34	0.07	U	0.07	3.8		2.7	5.8
Equipment Blank of J00M35	J00M28	04/18/03	0.01	U	0.01	0.33	U	0.33	0.07	U	0.07	1.2	U	1.2	
Area 1 2 to 3" bgs	J00M34	04/18/03	39.7		0.43	0.34	U	0.34	0.08	U	0.08	5030		670	7.2
Area 2 2 to 3" bgs	J00M35	04/18/03	28.7		0.4	0.37	U	0.37	0.08	U	0.08	6560		271	6.5
Area 3	J00M36	04/18/03	5.2		0.17	0.38	U	0.38	0.08	U	0.08	3960		266	6.2
Area 4	J00M37	04/18/03	13.7		0.47	0.41	U	0.41	0.09	U	0.09	8290		289	6.4
Duplicate of J00M35	J00M38	04/18/03	25.6		0.43	0.38		0.36	0.08	U	0.08	6210		267	6.5
Concrete	J00M49	04/21/03	0.05		0.02	0.33	U	0.33	0.07	U	0.07	484		25.3	10.4

* Only analyte is hexavalent chromium.

bgs = below ground surface

HEIS = Hanford Environmental Information System

PQL = practical quantitation limit

Q = qualifier

U = undetected

Table B-1. 100-K-32 Confirmatory Sampling Data Summary (continued).

100-K-32 Aroclor Data.

Constituent	J00M22 Felt Sample Sample Date 4/18/03		
	µg/kg	Q	PQL
Aroclor-1016	280	U	280
Aroclor-1221	570	U	570
Aroclor-1232	280	U	280
Aroclor-1242	280	U	280
Aroclor-1248	280	U	280
Aroclor-1254	280	U	280
Aroclor-1260	280	U	280

100-K-32 Asbestos Data.

Sample Area	HEIS Number	Sample Date	Asbestos Result
Area 1	J00MD6	04/18/03	Obvious presence of chrysotile asbestos. Trace amounts of amosite asbestos.
Area 2	J00MD7	04/18/03	Trace presence of chrysotile asbestos in small piece of tar.
Area 3	J00MD8	04/18/03	No asbestos found.
Area 4	J00MD9	04/18/03	No asbestos found.
Duplicate of J00MD7	J00MF0	04/18/03	No asbestos found.
Felt	J00M62	04/17/03	Contains 1-2% chrysotile asbestos.

Table B-2. 100-K-32 Verification Sampling Data Summary.

Sample Area and Depth BGS	HEIS Number	Sample Date	Arsenic			Barium			Cadmium			Chromium			Hexavalent Chromium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
Discolored Soil 2' to 3'8" bgs	J015W0	12/16/03	1		0.41	57.2		0.02	0.04	U	0.04	4.5		0.1	0.23		0.22
Equipment Blank of J01761	J01760	01/20/04	0.34	U	0.34	1.6		0.02	0.04	U	0.04	0.15		0.05	0.2	U	0.2
Area 1 2 to 3' bgs	J01761	01/20/04	2.6		0.4	92.9		0.02	0.05	U	0.05	16.8		0.06	0.24	U	0.24
Area 2 2 to 3' bgs	J01762	01/20/04	1.9		0.34	97.4		0.02	0.2		0.04	10.9		0.05	0.23	U	0.23
Duplicate of J01761	J01763	01/20/04	3		0.37	87.5		0.02	0.04	U	0.04	16.9		0.05	0.24	U	0.24

Sample Area and Depth BGS	HEIS Number	Sample Date	Lead Value			Mercury		
			mg/kg	Q	PQL	mg/kg	Q	PQL
Discolored Soil 2' to 3'8" bgs	J015W0	12/16/03	3.3		0.19	2.3		0.05
Equipment Blank of J01761	J01760	01/20/04	0.52		0.2	0.02	U	0.02
Area 1 2 to 3' bgs	J01761	01/20/04	6		0.23	2.2		0.04
Area 2 2 to 3' bgs	J01762	01/20/04	7.1		0.2	2.4		0.03
Duplicate of J01761	J01763	01/20/04	6.5		0.22	1.4		0.02